

1

**PORTABLE DISPLAY DEVICE****CROSS-REFERENCE TO RELATED APPLICATION**

This Application is a Divisional of U.S. application Ser. No. 11/915,392, filed Nov. 26, 2007, which is a Section 371 National Stage Application of International Application No. PCT/KR2005/001634, filed Jun. 1, 2005 and published as WO 2006/129892 on Dec. 7, 2006, in English.

**TECHNICAL FIELD**

The present invention relates to a foldable type portable display device that can realize the large-sized screen with plural display elements, and more particularly to a portable display device that optical elements provided on the top surfaces of display elements, respectively are arranged coming into contact each other when the display device is unfolded, thereby minimizing a non-display area on a joint portion between the adjacent display elements.

**BACKGROUND ART**

Conventionally, a technology for realizing a large-sized screen with two or more display elements was applied in a large display device. In recent years, as the mobile information system has been developed to have a wireless internet function, a need of the large-sized screen is more increased. However, the large-sized screen cannot meet the most of portable characteristics of the portable display device and then a foldable type portable display device is suggested.

Generally, as flat display elements used for the portable display device, a liquid crystal display (LCD), a thin film transistor (TFT)-LCD, a field emission display (FED), a plasma display panel (PDP), an electro luminescent (EL), an electronic paper and etc., have been used.

As a portable display device with multiple display elements, a foldable type display device is suggested for increasing portable characteristics. In a prior foldable type display device, when panel housings having display elements, respectively are unfolded, there is a joint portion between the adjacent display elements. However, there are problems that the display elements of the panel housings should be precisely machined to minimize the width of the joint portion and the high reliability is need in the machining.

**DISCLOSURE OF INVENTION****Technical Problem**

The present invention has been made in an effort to solve the problems described above and it is an objective of the present invention to provide a foldable display device that at least two foldable panel housing for receiving a display element may be folded or unfolded, sidewalls of an optical elements coming into contact to form a single large size screen in the unfolded position of the panel housings.

**Technical Solution**

To achieve the above objective, the present invention provide a portable display device comprising;

at least two display elements;

at least two foldable panel housings for receiving and supporting the display elements, electronic components for driving the display elements; and

2

optical elements provided on the top of the one of the sidewalls of the panel housings and mounted in a joint portion of the display elements;

wherein one of the sidewalls of the panel housings forms openings or a connecting joint portion, and the sidewalls of the optical elements are adjacently disposed each other when the panel housings are unfolded.

The display elements are disposed in contact with one of the sidewalls the panel housings, and a protecting member is provided on the optical element, and the protecting member and the optical element may be integrally formed. Preferably, the distance between a pivot center of the panel housings and the optical element or the protecting member is within 1 mm when the panel housings are pivoted. And sealants for sealing an upper and lower substrates of the display elements is positioned within 0.5 mm from pixels in the connecting joint portion of the display elements.

The optical elements are provided to change the path of the display light and the angle of the changing of the path is determined by considering a non-display area and a distance between the display elements and the optical elements.

When the display elements are mounted on a supporting member, it is preferred that the sidewalls of the supporting member is cut to form the openings or the connecting joint portions.

When the display elements are mounted on a chassis, the sidewalls of the display elements are covered only at the connecting joint portion of the display elements.

Data signals and common signals provided to the first and second display elements are preferably divided and an outer electrode for transferring data signals and common signals are provided at the opposite side to the joint portion of the display elements.

**Advantageous Effects**

The present invention provides a foldable type portable display device for realizing the large-sized screen with a joint portion as a non-display area between two or more display panels is minimized.

According to the present invention, the non-display area as the joint portion may be compensate by means of an optical element, and the driving signals are divided and transferred to two display elements for realizing a single large-sized screen.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIGS. 1 and 2 are perspective views illustrating a foldable type portable display device according to the present invention;

FIGS. 3 to 5 are sectional views showing unfolded panel housings of a portable display device of the present invention;

FIG. 6 is an perspective view showing a portable display device in a partially unfolded position;

FIGS. 7 and 8 are perspective views showing a portable display device with a joint gap between display elements according to the present invention;

FIG. 9 is a plan view illustrating a portable display device of which the panel housings are unfolded without the optical elements;

FIGS. 10 and 11 are views illustrating an optical element;

FIG. 12 is a perspective view of a portable display device with a cover removed;

FIG. 13 is a sectional view of a portable display device with a panel housing unfolded;

FIGS. 14 to 16 are perspective views showing a supporting member for mounting a display panel assembly;